Code for Sustainable Homes (Nov 2010)

74 Charlotte Street, London

Pre Assessment Report

16th February 2012

CODE FOR SUSTAINABLE HOMES

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4.			
5.			

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1.0 Executive Summary

The CSH rating believed to be achievable for the five residential units at 74 Charlotte Street is Code Level 4. A CSH pre-assessment supported by additional preliminary energy modelling has been carried out with the design team, which places all units in the development within the Code 4 category. A further scenario lists further ways to achieve Code Level 4.

Details of the credits that are considered to be achievable have been listed in section 6.0, 7.0 and 8.0.

2.0 Introduction

This report covers the Code for Sustainable Homes (CSH) pre-assessment works that have been carried out by the design team to identify a feasible route to achieve CSH Level 4 for the residential units at 74 Charlotte Street.

This development has been assessed under the CSH (Nov 2010). The project can be registered with the BRE under this scheme following planning consent.

It is recommended that the information contained within this pre-assessment be included in any specifications and contractor or supplier tenders, in order to ensure that the obligations discussed are implemented. This should prevent the score from reducing significantly during the formal design stage and post construction stage assessments.

3.0 About The Code for Sustainable Homes

3.1 Introduction

The Code for Sustainable Homes (CSH) was launched on the 10th April 2007 by The Government, specifically the Department for Communities and Local Government (DCLG) and is maintained and Quality Assured by the BRE and by its registered assessors. The CSH is provided as a measure of future Building Regulations targets driven by increasingly taxing Government and EU targets. The CSH is measured using star ratings from 1 to 6, 1 being the worst. These correlate to EcoHomes as follows:

CSH Level	EcoHomes Rating
★	Pass
★★	Good
★★★	Very Good
★★★★	Excellent
★★★★★	Better than Excellent
★★★★★★	Better than Excellent

This is not a precise correlation. The BRE estimate that the additional build cost of achieving a 3 star rating over an EcoHomes rating of Very Good is approximately £500- £1,500 per dwelling. This is due to mandatory requirements, individual assessments and post construction reviews required under the CSH.

3.2 Code for Sustainable Homes versus EcoHomes

The CSH is based on the EcoHomes 2006 methodology but with some significant changes. In summary the main changes are:

- The CSH assesses each individual dwelling and not the development as a whole. The only exception is where block compliance is sought under Part L1A of the Building Regulations, in which case the energy credit can be assessed based on the whole block.
- All CSH assessments will be subject to a post construction review. The BRE will issue an interim design certificate but the final certificate will not be issued until the dwellings are complete and an assessor has confirmed that the criteria have been met.
- There are minimum requirements in energy, water, materials and surface water run-off to achieve specific CSH levels.
- Energy is now measured as an improvement over Building Regulations Part L1A 2010 and the minimum requirements against each CSH level are as follows:

CSH Level	Improvement over Building Regulations
★★★★	25%
★★★★★	100%
★★★★★★	Full Zero Carbon

** Energy Saving Trust*
http://www.saveyour20percent.org/housingbuildings/professionals/standards/intro/

- The water credits have been changed to be assessed as litres/person/day and will include other water using appliances such as bidets and kitchen taps. The minimum requirements are as follows:

CSH Level	Water Use (litres/person/day)
★	120
★★	120
★★★	105
★★★★	105
★★★★★	80
★★★★★★	80

- There is also a minimum requirement for materials for at least three of the following key elements of construction are specified to achieve a BRE Green Guide 2008 rating of at least D
    - Roof structure and finishes
    - External walls
    - Upper floor
    - Internal walls
    - Windows and doors

- Materials will be assessed on an area weighted basis against the new Green Guide.
- Materials credits are calculated against points for different ratings e.g. a D-rated wall would be calculated on the basis of 0.25 points and weighted by the area.
- The minimum requirement for surface water run-off is to ensure that peak run-off rates and annual volumes of run-off will be no greater than the previous conditions for the development site. For many sites this may require an appropriate consultant.
- There are also minimum requirements for construction site waste management and provision of recycling facilities for each dwelling.
- There are 2 new criteria. There are 4 credits for achieving the Lifetime Homes standard and an additional credit for providing compost bins.
- The sound testing credit now allows for the use of the Robust Standard Details, but does require that the detail has, at some point, been tested to ensure compliance.

3.3 Code for Sustainable Homes Scoring

Projects are assessed using a system of credits. These credits are grouped into the following categories:

- Energy
- Water

- Materials
- Surface Water
- Waste
- Pollution
- Health
- Management
- Ecology

In order for a score to give an appropriate balance across such a broad selection of issues, a weighting system has been developed through consultation with a range of industry representatives. This weighting system provides a relative importance to each of the credit categories. The current weightings are as follows:

Category	Weighting for CSH
Energy/CO_2	36.4%
Water	9%
Materials	7.2%
Surface Water	2.2%
Waste	6.4%
Pollution	2.8%
Health	14%
Management	10%
Ecology	12%

The number of environmental criteria within each of the categories varies and as a result, there are a different number of credits within each category. Due to the different number of credits within each category and the differing category weightings, the overall value of each individual credit (as a percentage of the total number of credits in the assessment) is different depending on the category.

The mandatory points (discussed in 3.2 above) can be added to the other 'tradable' points achieved in all the other categories to achieve a total number of points. This can then be used to determine the CSH Level that has been achieved. For each level it is necessary to:

- Achieve the all mandatory minimum standards for that level
- Achieve the total tradable points needed for the level (the sum of both extra tradable points achieved for mandatory issues and tradable points for flexible issues)

In order to achieve credits, information must be submitted to the assessor who will then award credits based on the current CSH compliance criteria. The weightings are then applied to the sum total for each credit category to achieve an overall score. In the case of a pre-assessment, this is an informal process; for the full assessment, this information needs to be provided in full as confirmation of commitment to achieve each credit. This score is then used to identify the overall CSH level rating using the following ranges:

Rating	CSH Score
★	36 – 47
★★	48 – 56
★★★	57 – 67
★★★★	68 - 83
★★★★★	84 - 89
★★★★★★	90 - 100

3.4 Assessment Procedure

Assessments are carried out to award credits and points (after weighting) based on environmental features of the individual dwelling. These features either refer to:

- Features which the dwelling shares with all other dwellings on the site known as **Site Wide Issues**
- Features which have access to some common facility shared with a number of other dwellings known as **Shared Issues** (but less than the whole site)
- Features which relate to the performance of the dwelling itself known as **Dwelling Issues**

In order to reduce the number of different assessments, dwellings may be combined together as similar 'CSH Dwelling Types'. To be of the same 'CSH Dwelling Type' dwellings must have exactly the same set of CSH scoring features. Within each category, issues are scored initially as credits. They are then converted through category weightings to percentage scores known as 'Points".

Some credits are always awarded for the site as a whole, whilst other credits can be awarded either for an individual dwelling or for a site wide approach or for a combination of the two (an example of this would be the provision of renewable energy).

Once the design stage assessment has been carried out, based on information submitted to the assessor, a report is written which describes which credits have been awarded. This report then goes to the BREEAM/CSH team at the BRE for QA procedures. If the QA is passed then an interim certificate is issued depending on the rating scale and will result in a building being awarded an 'Interim' CSH Level 1 to 6 rating.

The second part is carried out after construction (called the Post Construction Review) –and each 'Dwelling' is given a 'Final' CSH certificate at this stage.

4.0 Code for Sustainable Homes Scores

4.1 Schedule of 'Code Types'

The development is made up of 5 residential units. The majority of credits are achieved in both cases, but all units perform differently in terms of their fabric efficiency under Ene2.

4.2 Credit Summary

The following table gives a summary of credits identified in order to achieve a feasible route to Code Level 4 for each of the units, and further potential options:

	Available	Unit 5	Units 3/4	Units 1/2
Ene 1 - Dwelling Emission Rate	10	3	3	3
Ene 2 - Building Fabric	9	0	3	7
Ene 3 - Energy Display Devices	2	2	2	2
Ene 4 - Drying Space	1	1	1	1
Ene 5 - Energy Labelled White Goods	2	1	1	1
Ene 6 - External Lighting	2	2	2	2
Ene 7 - Low or Zero Carbon (LZC) Technologies	2	2	2	2
Ene 8 - Cycle Storage	2	1	1	1
Ene 9 - Home Office	1	1	1	1
Energy and Carbon Dioxide Emissions Totals:	**31**	**13**	**16**	**20**
% Energy and Carbon Dioxide Emissions Score Totals:	**36.4**	**15.27**	**18.79**	**23.48**
Wat 1 - Indoor Water Use	5	4	4	4
Wat 2 - External Water Use	1	1	1	1
Water Totals:	**6**	**5**	**5**	**5**
% Water Score Totals:	**9**	**7.5**	**7.5**	**7.5**
Mat 1 - Environmental Impact of Materials	15	9	9	9
Mat 2 - Responsible Sourcing of Materials - Basic Building Elements	6	4	4	4
Mat 3 - Responsible Sourcing of Materials - Finishing Elements	3	2	2	2
Materials Totals:	**24**	**15**	**15**	**15**
% Materials Score Totals:	**7.2**	**4.5**	**4.5**	**4.5**
Sur 1 - Management of Surface Water Run-off from Developments	2	1	1	1
Sur 2 - Flood Risk	2	2	2	2
Surface Water Run-off Totals:	**4**	**3**	**3**	**3**
% Surface Water Run-off Score Totals:	**2.2**	**1.65**	**1.65**	**1.65**
Was 1 - Storage of Non-Recyclable Waste and Recyclable Household Waste	4	4	4	4
Was 2 - Construction Site Waste Management	3	3	3	3
Was 3 - Composting	1	0	0	0

Waste Totals:	**8**	**7**	**7**	**7**
% Waste Score Totals:	**6.4**	**5.6**	**5.6**	**5.6**
Pol 1 - Global Warming Potential (GWP) of Insulants	1	1	1	1
Pol 2 - NO_x Emissions	3	3	3	3
Pollution Totals:	**4**	**4**	**4**	**4**
% Pollution Score Totals:	**2.8**	**2.8**	**2.8**	**2.8**
Hea 1 - Daylighting	3	1	1	1
Hea 2 - Sound Insulation	4	4	4	4
Hea 3 - Private Space	1	1	0	0
Hea 4 - Lifetime Homes	4	4	4	4
Health & Wellbeing Totals:	**12**	**10**	**9**	**9**
% Health & Wellbeing Score Totals:	**14**	**11.67**	**10.5**	**10.5**
Man 1 - Home User Guide	3	3	3	3
Man 2 - Considerate Constructors Scheme	2	1	1	1
Man 3 - Construction Site Impacts	2	2	2	2
Man 4 - Security	2	2	2	2
Management Totals:	**9**	**8**	**8**	**8**
% Management Score Totals:	**10**	**8.89**	**8.89**	**8.89**
Eco 1 - Ecological Value of Site	1	1	1	1
Eco 2 - Ecological Enhancement	1	1	1	1
Eco 3 - Protection of Ecological Features	1	1	1	1
Eco 4 - Change in Ecological Value of Site	4	3	3	3
Eco 5 - Building Footprint	2	2	2	2
Ecology Totals:	**9**	**8**	**8**	**8**
% Ecology Score Totals:	**12**	**10.67**	**10.67**	**10.67**
OVERALL TOTALS:		**73**	**75**	**79**
OVERALL SCORE TOTALS:		**68.55**	**70.9**	**75.59**

N.B. Highlighted in grey are those credits with mandatory elements. Please see the details below for what is required.

5.0 Pre-Assessment Results

Following the application of the environmental weightings, the above credit totals equate to the following percentage scores:

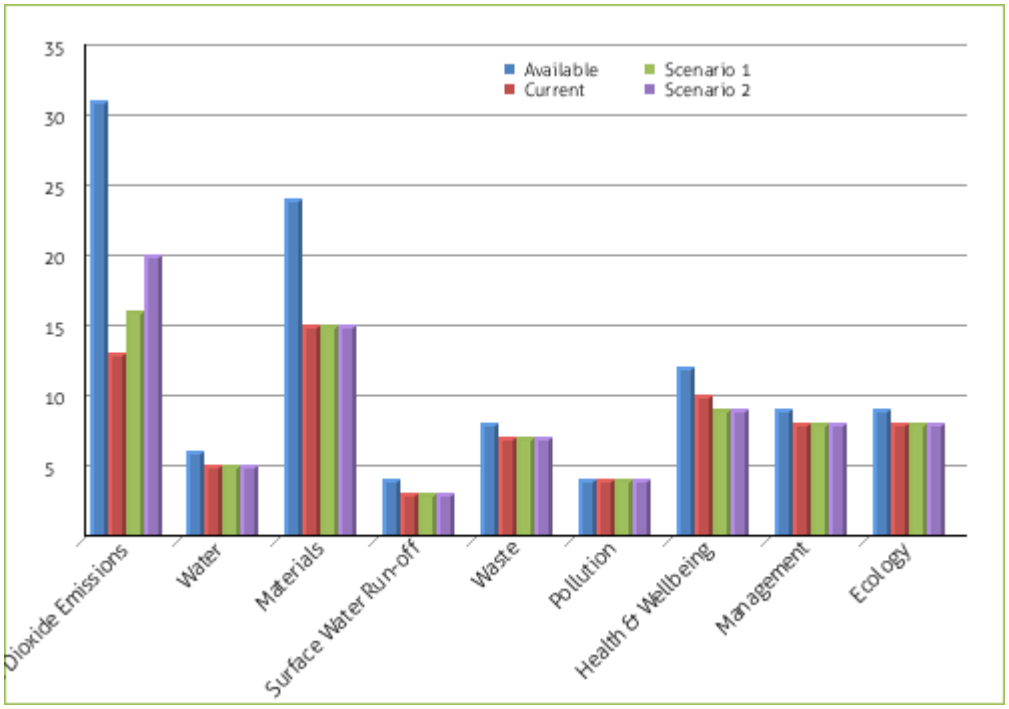
- **Unit 1 & 2: 75.59%**
- **Unit 3 & 4: 70.89%**
- **Unit 5: 68.54%**

The scores for all units are over the 68% required for CSH Level 4 and all mandatory requirements for this level have been achieved.

The differences between the scores have been highlighted in section 4.2 and are detailed further in section 6.0.

These scores per section and per scenario are illustrated below:

Key: Blue - available; Red – Unit 1/2; Green – Unit 3/4; Purple – Unit 5



6.0 Key Features of the Pre-assessment

6.1 Energy

- **Ene 1:** It is hoped the dwellings will achieve a 25% improvement in CO_2 emissions (DER/TER) over Building Regulations Part L1a 2010. This achieves 3 credits. This is possible through the specification of good fabric efficiency and PV panels, and a highly efficient gas boiler. A SAP output summary based on assumed variables at this stage in the design has been used to inform this assumption.

- **Ene2:** The units broadly have very good fabric energy efficiency, and achieve a variety of credits. Units 1 and 2 achieve at least 7 credits, units 3 and 4 achieve 3 credits; however the top unit due to its exposed roof has not been assumed to achieve any credits currently.

- **Ene 3:** A properly specified Energy Display Device will be provided that monitors electricity and primary heating fuel supply.

- **Ene 4:** Drying lines over the bath to allow for natural drying will be provided to both units.

- **Ene 5:** Highly efficient A+ rated fridge/freezers, and A rated washing machines will probably be provided to all flats. In any event, information on EU labelling will be provided to each unit as part of the Home User Guide, therefore one credit can be targeted as a minimum.

- **Ene 6:** Space lighting will be specified which is 100% energy efficient and so the first credit can be achieved. Should security lighting be provided, it will have the following features to achieve the second credit; a maximum of 150W, and fitted with a PIRs and daylight cutoff sensors.

- **Ene 7:** Low or zero carbon technologies in the form of PV will be incorporated into the design to achieve at least a 15% reduction.

- **Ene 8:** One credit is achievable for provision of 6 bike spaces in the bike store. There is not sufficient space to provide 9 spaces.

- **Ene 9:** A home office area/study is provided in each of the units. This study will have adequate desk space, telecommunications and power points, ventilation and access to an openable window.

6.2 Water

- **Wat 1:** The mandatory requirement to limit internal potable water use to a maximum of 105 litres/person/day will be achieved. However the design team have made further commitments to achieve 90 litres/person/day. Currently it is assumed that the following fittings will be used to achieve this requirement:
  - 5 litres/min non-kitchen taps
  - 7 litre/min showers

- 120 litres to capacity baths
- 1.25 litres per place setting dishwasher
- 7.85 litres per kg dry load washing machine
- 4/2 litres dual flush WC
- 5 litres/min kitchen taps
- No water softener

Should higher specification sanitaryware be required by occupants, then rainwater and/or greywater collection may need to be incorporated to still achieve this number of credits.

- **Wat 2:** Since there is no external landscaping requiring irrigation, this credit can be awarded by default.

6.3 Materials

- **Mat 1:** The BRE has published a Green Guide, which rates the relative environmental impact of different specifications for the following building elements:

  - Roof
  - External Walls
  - Internals Walls
  - Upper and Ground Floors
  - Windows

  The Green Guide can be found at www.thegreenguide.org.uk, and can be accessed for free. Each environmental rating (ranging from A+ to E), equates to a certain number of credits, as can be seen below:

Green Guide Rating	Number of Credits
A+ Rating	3
A Rating	2
B Rating	1
C Rating	0.5
D Rating	0.25
E Rating	0

  Under MAT1, there is a mandatory requirement for at least 3 of the 5 building elements listed above, to have a Green Guide rating of A+ to D.

  The design team have reviewed the build materials on the Green Guide website which achieve the following likely rating:

  - Roof: concrete stud; B rated.

- External walls: brick and block; A+ rated.
- Internal walls: solid blockwork or steel stud; A rated.
- Windows: timber framed; A+ rated.
- Upper and ground floors: precast concrete; B Rated

Therefore the mandatory requirements are achieved and 9 of the 15 credits.

- **Mat 2**: Four credits have been targeted for responsible sourcing of the basic building elements. Up to 6 credits are available for responsibly sourcing materials within the following building elements:
  - Frame
  - Ground floor
  - Upper floors (including separating floors)
  - Roof
  - External walls
  - Internal walls (including separating walls)
  - Foundations/substructure (excluding sub-base materials)
  - Staircase

  Information needs to be provided to the contractor to ensure materials will be sourced from suppliers with EMS (Environmental Management System) or FSC/PEFC certification.

- **Mat 3**: Two credits have been targeted for responsible sourcing of the finishing elements. Up to 3 credits are achievable for responsibly sourcing materials (e.g. EMS/FSC/PEFC as above) within the following internal finishing elements:
  - Stairs
  - Windows
  - External and internal doors
  - Skirting
  - Panelling
  - Furniture
  - Fascias

  Since the client is likely to know where the majority of the materials will be sourced, and these will largely be timber, it was felt that the majority of the materials could be responsibly sourced and therefore minimally 2 credits targeted.

6.4 Surface Water Run-off

- **Sur 1**: The mandatory requirement should be achievable. It is believed there will be no increase in man-made impermeable area as a result of the new development, therefore the Peak Rate of Run-Off and Volume of Run-Off criteria are not applicable. The requirements are as follows:

  Designing for local drainage system failure.

Demonstrate that the flooding of property would not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).

Note: Where the run-off is being discharged into an existing drainage system, the responsible body may stipulate a more stringent set of hydraulic flow rate criterion which will therefore take precedence.

Given the collection of the rainwater to flush the toilets in the restaurant below, it was felt this could be used to demonstrate an attenuation of the first 5mm rainfall, and therefore the first credit can be targeted.

- **Sur 2:** It is currently presumed that the site is in an area defined as having a low (1 in 1000) probability of flooding from Environment Agency maps. Written clarification from the Environment Agency would confirm this.

6.5 Waste

- **Was 1**: Mandatory requirements for the provision of a large enough storage area for either all of the external containers provided by the Local Authority or minimum capacity calculated by BS5906 will be met. Camden require recycling to be sorted into paper/card, other recyclables seperately therefore, as well as adequate external recycling storage, two bins of not less than 30 litres joint capacity will be provided in a dedicated position in the kitchen. This achieves the full 4 credits available.

- **Was 2**: A Site Waste Management Plan (SWMP) will be provided for the first credit which has targets, procedures and reporting of waste reduction. Procedures and commitments will be in place to minimise, sort, reuse and recycle waste generated from the site in compliance with best practices and divert 85% from landfill to achieve all three credits.

6.6 Pollution

- **Pol 1**: Insulation with GWP (Global Warming Potential) of less than five and Ozone Depleting Potential (ODP) of zero will be provided in all cases (careful consideration of the door insulation will need to be given), therefore this credit is targeted.

- **Pol 2**: Gas boilers will be specified which produce NOx emissions of <40mg/kWh. Therefore all credits can be targeted.

6.7 Health and Wellbeing

- **Hea 1**: At present, the daylight factor of 1.5% in the study and living rooms are likely to be met, which achieves one credit.

- **Hea 2:** An acoustician (or tested Robust Details) will be employed to confirm 8dB better than Building Regulations and pre-completion testing will be carried out with remedial work as necessary, as it is believed the materials will perform well.

- **Hea 3**: Private space in the form of balconies will be provided to some but not all units.

- **Hea 4**: Lifetimes Homes will be achievable for all units

6.8 Management

- **Man 1**: A Home User Guide will be produced to target the full credits, providing information on the operation of each dwelling, as well as further information on the site and surrounding area. It needs to be decided who will provide this. This achieves all of the three credits available.

- **Man 2**: The main contractor will sign up to the Considerate Constructors Scheme, and so the first credit is targeted.

- **Man 3**: The contractor will implement the following points (or substitute others from the CSH guidance) to mitigate construction site impacts and achieve both credits:

    - Monitor and report CO_2/energy use from site activities,
    - Monitor and report water consumption from site activities
    - Air (dust) pollution from site activities
    - Water (ground and surface) pollution from site activities

6.9 Ecology

- **Eco1**: The land used for development was previously Brownfield (another building) with no features of ecological value believed to be present; therefore this credit can be targeted.

- **Eco2**: The design team has made a commitment to enhance the ecological value of the site by taking advice from an ecologist, adopting all of the ecologist's key recommendations and 30% of the additional recommendations made in a full survey/report to be carried out. It may be possible to use the roof space and balcony areas. One credit is targeted.

- **Eco3**: As the site is assumed to have no ecological value, this credit cannot be achieved.

- **Eco4**: A commitment has been made to improve the biodiversity of the site by between 6 and 9 species per hectare, achieving three of the four credits.

- **Eco5**: The net internal ground floor area to net floor area ratio will be greater than 3:1, including the restaurant beneath over two floors, therefore both credits can be targeted.

7.0 Points to Note for Upper Unit 5

All credits above are shared for the units, except for **Ene2:** Fabric Efficiency and **Hea3:** Private Space. This upper unit has the main roof space, therefore more heat loss through its building fabric and therefore performs more poorly than the other units that do score a variation of credits under Ene2. However, it is provided with a balcony, therefore Hea3 can be targeted.

8.0 Other Options to Achieve CSH Level 4

- **Ene1/2:** With further investigations into fabric efficiency and renewables it may be possible to achieve more credits.
- **Ene 5:** By providing all white goods with a high energy efficiency, it would be possible to achieve both credits.

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- **Mat1**: It may be possible, by modifying the materials specified, to gain further credits here.
- **Mat2/3:** It is possible that more credits can targeted for providing further Green Guide rated, responsibly sourced materials for the basic and finishing elements.
- **Man 2**: Should the main contractor exceed best practices (and 32 points) under the Considerate Constructors Scheme, both credits could be targeted.
- **Eco4**: It may be possible to increase the species number by greater than 9 with the involvement of an ecologist, therefore targeting all four credits.